

About the procedures aimed at bird strike avoidance.

#### 1. Introduction.

The arrival of subsonic jet aircraft into the commercial fleets and their rapid increase has emphasized a potent problem for a long time taken as minor. The recent introduction of high bypass ratio engines has greatly enlarged this problem because frontal area of each engine increases more than three times at the same time that the quantity of air passing through the intake has almost trebled. The fleet of these 6500 aircraft, flying on the daily average of 8 hours, used all over the world, experience a daily significant number of strikes, some times very serious, caused by birds.

It then becomes necessary to stop this increase and if possible reduce as far as possible the number of these strikes.

More and more accurate information is collected in Europe on the behaviour of birds and on their reactions. It seems possible to forecast with an acceptable certainty their activities on and in the vicinity of airports. The problems in this field to be solved, some of them secondary, includes:

- 1e. Transmission, in a proper and clear language, of the information available on the airport to the real user (pilot most of time).
- 2e. Procedures to be recommended when the instant and accurate knowledge is available.

Those two items are briefly commented hereafter.

#### 1. Transmission of information.

That suppose that an international agreement could be achieved on the following:

1. Definition as complete as possible of different specific cases occurring in each phase of flight.
2. Definition of the time periods most adequate for transmission of such information (periods which are improper eg on landing below 200 ft).
3. Standard vocabulary in a language usable in the various international aviation languages.
4. Definition of legal aspects covering the use of such language by the ATC.

5. Research for an automatic warning system calling the pilot attention to the immediate danger created by bird activity in the areas to be flown in the next minutes.

2. Use of this information by crews.

Two types of uses can be developed:

1 - those which can be defined as "automatic". They do not required immediate positive action from the pilot

2 - These which are needing special manoeuvres from the pilot

3.1. Actions not requiring immediate action =

3.1.1. use of landing lights = was experimented and studies by BSCE "Analysis" WG without as yet showing definitive conclusions.

3.1.2. use of various transmitters on board of aircraft (HF, VHF, radar)  
The impact of various permanent transmission has not been studies yet. These emissions could be experimented as were landing lights. This possibility occurs very akward and may create other problems (frequency overworked, power not available.....)

3.1.3. use of special airborne transmitters. Very few trials have been made for financial reasons. One may also take into account the extra load to be carried and used only during a very short period of time.

3.2. Actions calling for special manoeuvres.

3.2.1. aircraft on ground.

3.2.1.1. take off (T.O.).

a) T.O. delayed when birds are reported or observed on the runway or in its vicinity.

b) T.O. aborted on pilot decision: the evaluation of the danger is the most delicate part of the decision process.

3.2.1.2. Landing.

After touch down, no specific action is possible, except a greater use of the brakes at the initiative of the pilot when seeing birds on the runway.

3.2.2. Aircraft in flight.

3.2.2.1. Take off/climb (up to 3000 ft).

a) Taking into account that a majority of strikes happen in the first few hundred feet during climb, a climb with a constant slope or rate of climb may be recommended. This procedure is often used in other cases such as noise abatment.

b) Other manoeuvres could not be envisaged during this phase: aircraft are very often in the lower range of their operating possibilities (outside

the margin usually taken for safety purposes).

3.2.2.2. Approach.

- a) Approaches at minimum speed, and on greater slope than used but only when in good visual conditions could be studied.
- b) Decelerated approaches may be discouraged.
- c) Visual manoeuvres, which are possible during approaches, are left to the pilot's judgement.
- d) Missed approaches may be contemplated in the case of intense bird activity reported by the tower or directly observed by the pilot.

3.2.2.3. On cruise.

- a) No specific procedures can be contemplated for transport aircraft which are very seldom subject to this risk.
- b) In the typical case of low flying military aircraft, special recommendations could be developed.

4. Conclusion.

Two parallel ways seems to be offered: the first one aimed to define an international vocabulary and its appropriate use, the other to tabulate specific procedures to be recommended and used.

A trial has to be carried out for both cases. This trial could only be voluntary and should not be limited to one airline or a specific geographical area.

Consequently it is recommended that a call be addressed to pilot, airline representatives on one side and to ATC controllers on the other side with a view to defining the conditions for such trials, schedules, and to list ways of collecting experience obtained from various individuals participating in this programme.

This collection of data could be spread over 3 years, with an interim report provided for the next BSCE meeting.